DOCUMENT RESUME

ED 286 593 PS 016 752

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TITLE Summary of Program Evaluation Results: 1985-1986 School Year Pre-Kindergarten Educational Program.
INSTITUTION Kamehameha Schools/Bernice Pauahi Bishop Estate, Honolulu, HI.
PUB DATE Oct 86
NOTE 86p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Academic Achievement; Auditory Tests; *Ethnicity; Expectation; *Hearing Impairments; Language Acquisition; Low Income Groups; *Parent Attitudes; Participant Satisfaction; Pregnancy; *Preschool Education; *Program Effectiveness; Program Evaluation; Sex Differences; Tables (Data)
IDENTIFIERS Hawaii; *Kamehameha Schools HI

ABSTRACT

Reported are findings of the 1985-86 program evaluation of the prenatal-to-preschool and preschool programs operating under the auspices of the Kamehameha Schools/Bishop Estate. Evaluation of the prenatal-to-preschool program (the Kupulani Program) included item analysis of the Questions about Pregnancy Test, development of a revised data collection and entry system, and a survey of former Kupulani participants. In general, former participants were pleased with the progress of their children in school. Evaluation of the five preschool programs used data obtained from parent interviews, children's responses on a battery of educational tests, and results from a hearing and articulation screening program. Findings indicated that the preschools were effective. Children demonstrated dramatic growth in the competencies measured by educational tests. They also showed more cognitive growth than other Hawaiian children and performed better than other entering kindergarten children of all ethnicities statewide on at least one major educational assessment. However, children's scores were not at the level of national norms, except in the area of psychomotor skills. Findings also indicated that Hawaiian children were more likely than non-Hawaiian children to fail the hearing screening. A pattern of significant relationship between hearing screening results and performance on tests of language skills 7 or 8 months later was found. (RH)

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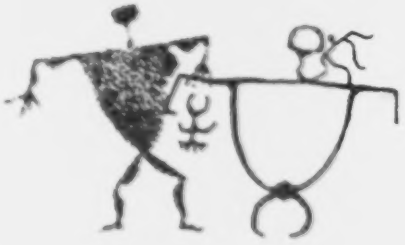

Summary of Program Evaluation Results:

1985 - 1986 School Year

Pre-Kindergarten Educational Program

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October 1986

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ACKNOWLEDGEMENT

The professional skills and personal commitment of Annette Okimoto are responsible for the high quality of the data-collection and test-scoring procedures employed to produce the preschool test scores reported here. The authors are sincerely appreciative.

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SUMMARY OF PROGRAM EVALUATION RESULTS:

1985 - 1986 SCHOOL YEAR

PRE-KINDERGARTEN EDUCATIONAL PROGRAM

I. OVERVIEW

This report presents a summary of data collected during the 1985-86 school year as specified in A Proposed Program Evaluation Plan for the Pre-kindergarten Educational Program: 1985-1986 (Heath & Plett, 1985). This plan has three major components: (a) the development of an Hawaiian Early Childhood Data Book, (b) program evaluation services directed toward the prenatal-to-preschool activities (Kupulani), and (c) program evaluation services in behalf of the preschool programs.

The Hawaiian Early Childhood Data Book will be presented as a separate volume.

Program evaluation work in relation to the prenatal-to-preschool program has taken three forms: (a) item analysis of the Questions About Pregnancy Test that has been used in the Kupulani project for some time (Table 1), (b) development of a revised data-collection and entry system, and (c) a survey of former Kupulani participants.

The Questions About Pregnancy Test was used in the Kupulani Program to assess the information needs of participants and to evaluate the effectiveness of the Kupulani program in meeting these needs. The development of a streamlined data-collection

and remote-entry system, not only revised the content and form of data collected at Kupulani but also developed a computer-software package that will permit all data collected to be entered directly, via an on-site computer terminal, into the mainframe system on the KS/BE campus. This system facilitates both case and program-management. The user's guide for this system has been produced in a separate document, Kupulani Full Screen Editor User's Guide (Stephens & Plett, May 1986).

All past participants of the Kupulani project that could be located were interviewed (N=29). The purpose of the interviews was to collect information about: (a) characteristics of participant families, (b) factors underlying the decision to participate in the Kupulani program, (c) continued use of program materials, (d) diffusion of information, (e) outcomes for the child, and (f) reactions to the program. The results of this survey are given in Table 2.

Data collected as part of program evaluation efforts in the five preschools that were in operation during the 1985-86 school year are presented in Tables 3 through 29 and Figures 1 through 10. Demographic data and other types of information (e.g. parental suggestions for the preschool program) were obtained from parent interviews.

Preschool pupils were administered a battery of educational tests, both at the beginning and at the end of the school year. All preschool students also participated in a hearing and articulation screening program.

A standardized index of socio-economic status based on an equally-weighted combination of (a) mother's education, (b) public-assistance status, and (c) per capita household income was developed and calculated for each pupil. Test and screening results were presented and explained to teachers in class-roster form and as individual student profiles.

Several research and instrument-development studies were undertaken during this school year by Evaluation Department staff, in collaboration with other Center for Development of Early Education staff (a comparison study of the educational achievement of KS/BE preschoolers and non-admitted applicants, development of a home educational-environment profile, and development of a preschool-activities descriptor instrument). The results of these studies will be reported in separate documents.

II. PRENATAL-TO-PRESCHOOL PROGRAMS

A. Item Analysis of the Questions About Pregnancy Test

The Questions About Pregnancy Test has been administered to mothers participating in the Kupulani Program. The test was first put in use in 1980 and used as a posttest only. In 1982 Kupulani staff began using the test as a pre-/post measure. The sample used in this study consisted of all women who completed both a pre- and post Questions About Pregnancy Test as of March, 1984. The test has not been used for about six months pending development of an improved instrument.

The questions are in several formats: distinguishing between common complaints and warning signals, multiple choice, true-false, and open-ended written response. Pre-post data were available for 12 participants who were experiencing their first pregnancy and 13 who were pregnant for the second time. The proportion in each group who gave a correct answer to each question, pre- and post-pregnancy, is given in Table 1. The significance of the difference between pre- and posttest performance is indicated.

Table 1

Summary Data for Kupulani Questions About Pregnancy Test Pretest/Posttest: Proportions of First and Second-Pregnancy Mothers Selecting Correct Responses

PRENATAL HEALTH PRACTICES	Correct Response	1st Pregnancy (n=12) Pre	1st Pregnancy (n=12) Post	2nd Pregnancy (n=13) Pre	2nd Pregnancy (n=13) Post
1. Indigestion	Common Complaint	0.75	1.00*	0.92	0.92
2. Vaginal discharge	Common Complaint	0.67	0.52	0.77	0.46
3. Bleeding from vagina	Warning signal	0.75	1.00	0.92	0.92
4. Sharp or continuous abdominal pain	Warning signal	0.83	0.83	0.10	0.10
5. Hemorrhoids	Common Complaint	0.58	0.67	0.77	0.69
6. Muscle cramps	Common Complaint	0.75	0.92	1.00	1.00
7. Blurring of vision or spots before eyes	Warning signal	0.67	0.83	0.54	0.92*
8. Marked decrease in amount of urine	Warning signal	0.75	0.92	0.92	0.92
9. Constipation	Common Complaint	0.83	0.83	0.92	0.92
10. Nausea and vomiting	Common Complaint	0.75	0.92	1.00	1.00
11. Varicose veins	Common Complaint	0.42	0.83*	0.77	0.85
12. Chills and fever	Warning signal	0.75	0.75	0.69	0.85
13. Sudden gush of water before the baby is due	Warning signal	0.92	1.00	1.00	1.00
14. Backache	Common Complaint	0.92	0.92	1.00	1.00
15. Discolorations of the skin	Common Complaint	0.42	0.75*	0.62	0.92*
16. Sudden marked swelling of the feet or ankles	Warning signal	0.58	0.67	0.67	0.38

* $p < .05$, two-tailed

Table 1 (Cont.)

PREPARING FOR BABY'S ARRIVAL	Correct Response**	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. What would you tell a friend to do as soon as she thinks she is pregnant?	**Make hosp. arrangements** Tell her friends Buy maternity clothes **Go see a doctor** Wait another month	0.92 0.08	1.00	1.00	1.00
2. How many cups of milk should you drink daily?	One Two **Three** **Four** Not necessary	0.16 0.42 0.42	0.08 0.92	0.23 0.62 0.15	0.08 0.38 0.54
3. During pregnancy smoking and use of medicinal and other drugs (including pakalolo and aspirin):	Helps if it relaxes me Will help my baby **Should be avoided** Is perfectly okay Is a concern only if a problem preg.	1.00	1.00	1.00	1.00
4. Most women do not need to change their diet.	False	0.67	0.75	0.69	0.92
5. Weight gain up to 30 pounds is advisable.	True	0.75	1.00	0.70	0.92
6. Sweets and starches are good for gaining weight.	False	1.00	1.00	1.00	1.00
7. Protein needs double during pregnancy.	True	0.83	0.92	0.77	0.77
8. If overweight, you should limit weight gain.	False	0.33	0.42	0.15	0.46*
9. You need 300 more calories per day during pregnancy.	True	0.58	0.58	0.23	0.46
10. Iron supplements eliminate the need for iron rich food.	False	0.75	0.67	0.77	0.54
11. Smoking tends to slow the baby's growth.	True	0.75	0.92	0.92	1.00

* $p < .05$, two-tailed

** Where multiple responses are listed, the correct response is in bold face type

Table 1 (Cont.)

PREPARING FOR BABY'S ARRIVAL (Cont.)	Correct Response	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
12. No drug has been proven safe for the baby.	True	0.83	0.92	0.77	0.92
13. Women should not exercise during pregnancy.	False	0.83	0.83	0.85	0.92

THE BABY'S GROWTH DURING PREGNANCY	Correct Response**	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. The most important time for the developing baby is:	**First three months**	**0.67**	**0.92**	**0.85**	**0.92**
	Fifth month	0.25	0.08		
	Seventh month			0.15	
	Ninth month	0.08			
	Week before birth				
	No response				0.08
2. The organ that nourishes the unborn baby is the:	Water bag	0.08			0.08
	Placenta	**0.42**	**0.83***	**0.54**	**0.54**
	Cord	0.50	0.17	0.46	0.31
	Ovary				
	Uterus				
	No response				0.08
3. Pregnant women usually begin to feel their baby move at about:	One month				
	Two-three months	0.08	0.08		0.08
	Four-five months	**0.92**	**0.92**	**0.85**	**0.85**
	Seven-eight months			0.15	
	Just before birth				
	No response				0.08

* $p < .05$, two-tailed
** Where multiple responses are listed, the correct response is in bold face type

Table 1 (Cont.)

LABOR AND DELIVERY	Correct Response**	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. Describe exercises helpful for labor and delivery.	**Two Correct**	**0.25**	**0.83***	**0.40**	**0.54**
	One Correct	0.42	0.17	0.15	0.38
	None Correct	0.33		0.45	0.08
2. Name three signs that labor has started.	**Three Correct**	**0.25**	**0.83***	**0.54**	**0.85**
	One or Two Correct	0.67	0.17	0.31	0.08
	None Correct	0.08		0.15	0.08
3. The first stage of labor is when:	Placenta delivered				
	Cervix thins	**0.50**	**0.75**	**0.69**	**0.85**
	Head settles	0.50	0.17	0.31	0.08
	Baby is born		0.08		0.08
	None of the above				
4. What is a Cesarean delivery and why is it done?	**Full Credit**	**0.33**	**0.58**	**0.46**	**0.69***
	Half Credit	0.50	0.42	0.46	0.31
	No Credit			0.08	
5. Holding your baby after birth or rooming-in is:	Silly			0.08	
	Dangerous			0.08	
	Acceptable	0.17	0.08	0.08	
	Good			0.08	0.08
	Very good	**0.83**	**0.92**	**0.69**	**0.92**

* $p < .05$, two-tailed

** Where multiple responses are listed, the correct response is in bold face type

Table 1 (Cont.)

BREASTFEEDING	Correct Response	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. Women rarely have questions about breast-feeding.	False	0.83	0.67	0.92	1.00
2. Breastfed babies are less likely to be fat.	True	0.42	0.33	0.38	0.46
3. Breastfed babies should only be fed every 4 hours.	False	0.75	0.92	0.85	0.85
4. Women who have Cesarean births cannot breastfeed.	False	1.00	1.00	0.92	1.00
5. Breastfeeding mothers cannot get pregnant.	False	0.75	1.00	0.85	1.00
6. Breastfeeding protects babies from allergies, etc.	True	0.92	0.92	0.62	0.62
7. Breastfeeding mothers need to eat well.	True	1.00	1.00	1.00	1.00

EARLY INFANCY	Correct Response	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. Boys must be circumcised to prevent infection.	False	0.50	0.50	0.62	0.62
2. At birth, the baby knows how to suck and swallow.	True	0.83	1.00	0.77	0.85
3. If you pick up a baby when it cries you will spoil it.	False	0.75	1.00	0.62	0.85
4. There is no point in talking to newborns.	False	1.00	1.00	0.92	1.00
5. You should never leave a baby on the bed or table.	True	1.00	1.00	1.00	1.00
6. All a new baby needs is food and dry diapers.	False	1.00	0.92	0.77	1.00

* $p < .05$, two-tailed

Table 1 (Cont.)

EARLY INFANCY (Cont.)	Correct Response	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
7. The safest place for baby in the car is your lap.	False	0.83	1.00	0.85	1.00
8. When picking up a newborn support his head.	True	1.00	1.00	1.00	1.00
9. Baby needs tender, loving care to develop normally.	True	1.00	1.00	0.92	0.92
10. Babies cannot see until they are two weeks old.	False	0.42	0.67	0.38	0.62

FAMILY PLANNING	Correct Response**	1st Pregnancy Pre	1st Pregnancy Post	2nd Pregnancy Pre	2nd Pregnancy Post
1. After birth, the menstrual period must start to get pregnant.	False	0.40	0.80*	0.29	0.71
2. Children are healthiest when born close together.	False	0.80	0.80	0.86	0.71
3. There is no time without risk of pregnancy.	True	0.80	0.90	1.00	1.00
4. Because they are growing, pregnant teens are high risk.	True	0.50	0.70	0.71	0.86
5. It is rare for teens to have low birthweight or premature infants.	False	0.70	0.80	1.00	0.86
6. The time a woman's body needs to prepare for another pregnancy is:	2 to 4 months	0.20			0.29
	6 to 9 months	0.20	0.20	0.14	
	1 to 3 years	**0.30**	**0.60**	**0.43**	**0.71**
	It doesn't matter	0.30	0.20	0.43	

* $p < .05$, two-tailed

** Where multiple responses are listed, the correct response is in bold face type.

B. The Remote Data-Entry System

The user's guide for the revised data collection and remote-entry system developed for Kupulani has been produced in a separate 36-page document (Stephens & Plett, May 1986).

C. Kupulani Follow-Up Participant Interviews

The results of the Kupulani Follow-Up Study are given in Table 2. The purpose of this study was to collect information about: (a) characteristics of participant families, (b) the decision to participate in the Kupulani Program, (c) continued use of program materials, (d) diffusion of information, (e) outcomes for the child, and (f) participants' reactions to the program.

These results are based on 29 telephone interviews conducted in July and August of 1986. Of the 137 former Kupulani participants, we found that 20 were no longer in Hawaii, 36 could not be located, and three declined to participate in the interviews. There were three instances of duplicate case numbers being assigned. Review of available records indicates that the participant status of as many as 50 cases is questionable. Only intake forms or no records at all exist in these cases.

The typical respondent first heard about the Kupulani program from friends or family members. With the exception of the pregnant-teen class at Kahuku High School, other professionals or

professional organizations were not an important source of referrals. Nearly all respondents reported sharing some of what they have learned at Kupulani with others. They were most likely to report information about perinatal care and childbirth as being new. Three-fourths of the respondent families were married couples. The income distribution was bimodal with most participants reporting incomes either below $10,000 or over $20,000. About half the families were receiving some sort of social service from a public agency.

In general, the respondents were very positive about their Kupulani experience. They usually retained the information and the materials acquired, and they shared them, especially with family members. They were typically pleased with the progress of their children in school. Most respondents had college-level educational aspirations for their children, although their expectations were often less. They particularly liked the home-visit, psychological support, and information-sharing aspects of the program.

Table 2

Responses to a Follow-Up Interview of Former Kupulani Participants

1. How did you first hear about Kupulani?

Family	8
Friend	7
Teacher	8
M.D.	1
Other Organization	3
Mailouts	1
Kupulani Workshop	1

2. Why did you decide to participate?

Help child	6
Curiosity	6
Program's good reputation	6
Learn about childcare, child development, parenting	5
For general information	4
Workshops	3
First pregnancy	3
Learn about prenatal care	2
Had extra time	2
Liked staff members	1
Hawaiian culture	1
Family encouraged participation	1
Early education for child	1
Friend encouraged participation	1

3. Did you talk with anyone to help you make up your mind?

Yes	14
No	14

a. Who did you talk with? _____
Had _____participated in Kupulani?

Yes	1
No	12

Table 2 (Cont.)

b. What is _____'s relationship to you?

Family	7
Friend	2
Teacher	2
M.D.	1
Other agency staff	1
Kupulani staff	1

4. Did you receive the quilt?

Yes	16
No	13

a. Do you still have the quilt?

Yes	13
No	13

b. Do you still use it?

Yes	12
No	1

(1) Why not?

Saving it	2
Never fully completed	1

c. What happened to it?

Lost	1

5. Did you receive any of the T-shirts?

Yes	19
No	10

a. Do you still have any of the T-shirts?

Yes	15
No	4

Table 2 (Cont.)

b. Do you still use them?

Yes	9
No	6

(1) Why not?

Children too big	4
Saving them	2

c. What happened to them?

Lost	1
Gave away	3

6. Did you receive the Kupulani Prenatal Guide?

Yes	16
No	11

a. Do you still have the Kupulani Prenatal Guide?

Yes	10
No	6

b. Do you still use it?

Yes	5
No	5

(1) Why not?

Children too big	2
Saving it	2
No time	1

c. What happened to it?

Lost	2
Gave away	1
Don't know	2

(2). Who did you give it to?_____
What is _____'s relationship to you?

Family	1

Table 2 (Cont.)

7. **What types of information if any, presented in the Kupulani program were new to you?**

Childbirth processes	11
How to play with and stimulate babies and children	7
None	5
Parenting skills	4
Pregnancy and prenatal care	4
Nutrition for children	4
Developmental stages	4
Newborn postnatal care	3
Homemade toys	2
Exercises	2
Behavior management	2
Home safety	1
Breastfeeding	1
How to teach children	1
Hawaiian culture	1
Everything	1

8. **Have you ever used things you learned at Kupulani with children besides _____?**

Yes	23
No	6

a. **What information have you used?**

How to play with and stimulate babies and children	12
Behavior management	3
Developmental stages	3
Toilet training	2
Homemade toys	2
Nutrition	2
Childcare	1
How to teach children (pre-literacy skills)	1
Teething	1
Parenting skills	1

b. **Who did you use it with? (name)_____**

c. **What is _____'s relationship to you?**

Family	12
Friend's child	2
Children at childcare center	1
Children at nursery school and Headstart	1

Table 2 (Cont.)

9. Have you ever shared any of the things you learned at Kupulani with someone else?

Yes	25
No	3

a. Who did you share with? _____

b. What is _____'s relationship to you?

Family	12
Friend	9
Neighbor	1

c. What information did you share?

General information about the program	8
Developmental stages	4
Childbirth	3
Prenatal care	3
How to play with and stimulate babies and children	2
How to join	2
What I learned	2
Homemade toys	2
Making the quilt	1
Prenatal exercises	1
Pregnancy	1
Hawaiian culture	1
Preparing for a new baby	1
Home safety	1
Nutrition	1

10. Is _____ in school now?

Yes	25
No	3

Table 2 (Cont.)

a. What school does s/he attend?

Hau'ula Elementary	6
Laie Elementary	4
Kahuku Elementary	3
Sunset Elementary	2
Headstart	2
Rainbow Preschool	1
Sunset Christian	1
Kamehameha Schools	1
Home Teaching	1
St. Michael's	1
St. Ann	1
Kaaawa Elementary	1

b. What grade is s/he in?

Preschool	4
Kindergarten	3
1st	7
2nd	9
3rd	2

c. On a scale from 1 to 5, with 1 being failing and 5 being excellent, how would you say _____ is doing in school?

1	Failing	0
2		2
3		7
4		7
5	Excellent	8

d. Does s/he like school?

Yes	23
No	1

e. What kinds of things does _____ tell you about school?

Specific subject areas	24
What he/she did that day	12
Interactions with other children	6
Homework	3
Tests and achievements	3

Table 2 (Cont.)

f. In your opinion, how does s/he get along with the other children at school?

Excellent	3
Good	9
OK	3

g. In your opinion, how does s/he get along with the teacher?

Excellent	5
Good	12
OK	2

h. Is _____ in any special programs at school?

Chapter one	1
Special education	1
Speech therapy	3
Learning disabled	1
Remedial reading	2

i. Are you satisfied with how _____ does in school?

Very satisfied	3
Satisfied	15
Dissatisfied	4

11. How much schooling would you like _____ to have?

High school graduate	4
College graduate	22
As much as possible	1

12. How much schooling do you expect _____ will get?

High school graduate	11
College graduate	14
Graduate/professional school	1

Table 2 (Cont.)

13. **Based on your own experiences, what are the best things about the Kupulani program?**

Home visits	10
Support, sharing	8
Information on parenting	7
Group activities, excursions, workshops	6
Staff	4
Projects (quilt, T-shirts, toys)	2
Testing child, learning about child's abilities	2
Information on childbirth	2
Information on how to teach in the home	2
Information on diet and nutrition	2
Attention to children	1
Good program	1
Enhanced child's growth	1
Enjoyable	1
No cost to family	1
Family oriented program	1
Learning about budgeting, homemaking	1
Home-based activities with children	1

14. **Again, based on your own experiences, what are the weaknesses of the Kupulani program?**

None	17
Not enough home visitors/program too small	3
Lack of follow-up after termination	2
Program was in transition	1
Program too large	1
Too much emphasis on single mothers	1
Not enough transportation (to M.D.)	1
Not enough publicity	1
Not enough Hawaiian culture	1
Not enough hands-on learning	1
Irregular schedule for group activities	1
Parents not allowed to participate with more than the first Kupulani Child	1

Table 2 (Cont.)

15. If a friend or relative told you they were thinking of participating in the Kupulani program and wanted to know what you thought, what would you tell them? Why?

Would recommend participation	28
Information about children, parenting	14
Things the child learns/benefits to the child	9
Good program	4
Group sessions	2
Mother learns about herself	1
Support system	1

16. Why did you leave the Kupulani program?

Child reached age 3	13
Moved out of area	8
Lost interest	2
Went to work	2
Not enough time	1
Not learning anything new	1
Child died	1

17. When you think about Kupulani, what are your strongest memories?

Community, friendships, o'hana, support	9
Home visits	8
Group activities, excursions, workshops	7
Staff	5
Information learned	4
Hawaiian culture, Winona Beamer	3
Videotaping	2
Learning to teach child	2
Enjoying child	1
Testing child	1
Child's learning enhanced	1

Table 2 (Cont.)

18. Who usually lives in your home and what are their relationships to _____? (If response is aunty or uncle probe if blood relative or family friend)

Mother present	28
Father/step-father present	23

19. What is your present marital status?

Married	21
Single	6
Separated	1

20. Next I am going to read some income levels to you and I want you to tell me which best describes your family's income, including any Social Security, Unemployment, or DSSH assistance you may receive, this does not include foodstamps or rental subsidies.

Less than $5,000	5	$20,000 to $24,999	4
$5,000 to $7,499	5	$25,000 to $34,999	3
$7,500 to $9,999	1	$35,000 to $49,999	4
$10,000 to $14,999	1	$50,000 or more	0
$15,000 to $19,999	4		

Table 2 (Cont.)

21. Which of the following service agencies have you or your family used in the last year and which are you currently using? (read list)

	In the last year	Current
Headstart	7	2
Other preschool	4	4
Queen Lilioukalani Children's Center	2	2
Northern Koolau Community Health Education Office	2	
Public Health Nurse	5	2
Ko'olauloa Counseling Center	4	1
Continuing Adult Education	3	1
North Shore Training Corporation	3	
Social Security (retirement, disability, medicare)	1	
Unemployment Insurance	2	1
AFDC	2	7
Foodstamps	2	10
Medicaid	2	5
Rental Subsidy	1	3

22. Are there any other service agencies you and your immediate family have used or are using?

None	25
HCAP-Utilities	2
Surplus food	1

III. PRESCHOOL PROGRAMS

A. Methods

The five preschools operating under the auspices of Kamehameha Schools/Bishop Estate (KS/BE) in 1985-86 enrolled approximately 100 children at about the age of four years and six months. Eighty-five percent of these children were of pure or part-Hawaiian ancestry.

One parent or guardian of each preschooler was interviewed by a KS/BE staff member at the end of the school year. (Interviewers failed to contact parents of 13 children.) A 25-question interview was used to obtain a detailed description of the child's family; the marital, occupational, and educational status of the parents; parental and household income; and parental expectations and aspirations for the child's educational future.

A team of audiologists from a children's hospital (Kapiolani Women's and Children's Medical Center) was contracted to provide hearing screening. This screening included pure-tone audiometry, otoscopy, and tympanometry. The children were classified for referral by the audiologists, on the basis of the hearing screening, into three categories: Pass, Moderate Hearing Dysfunction, and Severe Hearing Dysfunction.

Upon entrance, the preschoolers were given the Peabody Picture Vocabulary Test-Revised, Form L (Dunn & Dunn, 1981) and five tests from the CIRCUS battery: General Information, Quantitative Concepts, Language Usage, Psycho-motor Coordination,

and Language Understanding (Educational Testing Service, 1976). These tests were administered again at the end of the school year.

B. Results from Parent Interviews

End-of-school-year parent interviews were conducted at each of the five preschool sites. The only site with a significant number of missing interviews was Ulupono. The number and percent of responses to each question was tabulated for the total KS/BE preschool population and for each site. These tabulations are presented in Tables 3 through 23. The significance of differences among sites is given in most tables.

The level of satisfaction of the parents with the preschools, and especially with the teachers, was high. Most of the parents aspired for their children to become college graduates, although expectations were slightly less. Approximately three-fourths of the 100 preschoolers in these schools had both parents in the home; only three came from homes with divorced parents. AFDC/GA status was the only characteristic showing a statistically significant difference among sites. About one-quarter of the children were from families who receive some sort of public assistance. Approximately 85% of the children were Hawaiian or part-Hawaiian. The demographic data obtained through these interviews were used in the analysis of hearing-screening results and test performance.

Table 3

Parent Responses: Preschool Program Strengths

STRENGTHS	Response Count	Percent of Responses	Percent of Respondents
Teacher commitment & skills	32	20.9	39.0
Social skills used with children and teacher	21	13.7	25.6
Unspecified academic instruction	16	10.5	19.5
Hawaiiana	12	7.8	14.6
Spoken English, pre-reading, & pre-writing	11	7.2	13.4
Parent involvement	8	5.2	9.8
Aided emotional adjustment to school	7	4.6	8.5
Child's learning	7	4.6	8.5
Preparation for kindergarten	6	3.9	7.3
Small classes	6	3.9	7.3
Curriculum	4	2.6	4.9
Activities (excursions)	3	2.0	3.7
Free tuition	3	2.0	3.7
Math	3	2.0	3.7
Facilities	3	2.0	3.7
Develop motor skills	2	1.3	2.4
Everything	2	1.3	2.4
Fun for child	2	1.3	2.4
Low pressure on kids	2	1.3	2.4
Hot lunches	1	0.7	1.2
Length of day	1	0.7	1.2
Like Headstart	1	0.7	1.2
Total Responses	153	100	

82 Respondents
18 Missing Respondents

Table 4

Parent Responses by Site: Preschool Program Strengths

	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA	
STRENGTHS	N	%	N	%	N	%	N	%	N	%
Teacher commitment & skills	1	6.7	7	25.0	6	16.2	8	20.0	10	29.4
Social skills used with children and teacher	1	6.7	5	17.9	7	18.9	3	7.5	5	14.7
Unspecified academic instruction	3	20.0	4	14.3	7	18.9	1	2.5	1	2.9
Hawaiiana	2	13.3	2	7.1	2	5.4	6	15.0		
Spoken English, prereading, & prewriting	1	6.7	3	10.7	3	8.1	3	7.5	1	2.9
Parent involvement	2	13.3			2	5.4	3	7.5	1	2.9
Aided emotional adjustment to school					3	8.1	2	5.0	2	5.9
Children's learning	1	6.7			2	5.4	3	7.5	1	2.9
Preparation for kindergarten					3	8.1	2	5.0	1	2.9
Small classes							2	5.0	4	11.8
Curriculum			2	7.1			1	2.5	1	2.9
Activities (excursions)	1	6.7	1	3.6	1	2.7				
Free tuition	1	6.7					1	2.5	2	5.9
Math			1	3.6	1	2.7			1	2.9
Facilities	1	6.7					2	5.0		
Develop motor skills			2	7.1						
Everything	1	6.7							1	2.9
Fun for child			1	3.6			1	2.5		
Low pressure on kids									2	5.9
Hot lunches							1	2.5		
Length of day									1	2.9
Like Headstart							1	2.5		
Column Total	15	100.0	28	100.0	37	100.0	40	100.0	34	100.0

Table 5

Parent Responses: Preschool Program Weaknesses

WEAKNESSES	Response Count	Percent of Responses	Percent of Respondents
Facilities	6	20.0	7.4
Parent involvement	3	10.0	3.7
Teachers' skills	3	10.0	3.7
Not enough emphasis on academics	3	10.0	3.7
Not enough emphasis on language skills	2	6.7	2.5
Too few preschools	2	6.7	2.5
Boring	1	3.3	1.2
Teacher's management of the class	1	3.3	1.2
Fees collected for excursions	1	3.3	1.2
Little outdoor play	1	3.3	1.2
Lunch	1	3.3	1.2
No after school care	1	3.3	1.2
No KS acceptance	1	3.3	1.2
Signing in/out	1	3.3	1.2
Too much play	1	3.3	1.2
Too much Sesame Street	1	3.3	1.2
Weak discipline	1	3.3	1.2
Total Responses	30	100	

81 Respondents
19 Missing Respondents

Table 6

Parent Responses by Site: Preschool Program Weaknesses

	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA	
WEAKNESSES	N	%	N	%	N	%	N	%	N	%
Facilities							3	27.3	3	37.5
Parent involvement			1	12.5					2	25.0
Teachers' skills			1	12.5	1	33.3	1	9.1		
Not enough emphasis on academics			2	25.0					1	12.5
Not enough emphasis on language skills							1	9.1	1	12.5
Too few preschools					2	66.7				
Boring			1	12.5						
Teacher's management of the class	1	50.0								
Fees collected for excursions							1	9.1		
Little outdoor play							1	9.1		
Lunch			1	12.5						
No after school care							1	9.1		
No KS acceptance	1	50.0								
Signing in/out							1	9.1		
Too much play							1	9.1		
Too much Sesame Street							1	9.1		
Weak discipline			2	25.0					1	12.5
Column Total	2	100.0	8	100.0	3	100.0	11	100.0	8	100.0

Table 7

Parent Responses: Preschool Program Recommendations

RECOMMENDATIONS	Response Count	Percent of Responses	Percent of Respondents
More parent involvement	7	15.2	8.5
More preschools	7	15.2	8.5
Improve facilities & equipment	6	13.0	7.3
More Hawaiiana	4	8.7	4.9
More academics	3	6.5	3.7
Add after school care	2	4.3	2.4
Automatic KS acceptance from preschool program	2	4.3	2.4
More language arts	2	4.3	2.4
More social skills	2	4.3	2.4
Specific activities	2	4.3	2.4
Add enrichment program	1	2.2	1.2
Earlier sign-in times	1	2.2	1.2
Free field trips	1	2.2	1.2
Expand KEEP to Nanakuli Elementary School	1	2.2	1.2
Less Sesame Street	1	2.2	1.2
Lunch	1	2.2	1.2
More math	1	2.2	1.2
More motor skills	1	2.2	1.2
More outdoor play	1	2.2	1.2
	46	100	

82 Respondents
18 Missing Respondents

Table 8

Parent Responses by Site: Preschool Program Recommendations

RECOMMENDATIONS	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA	
	N	%	N	%	N	%	N	%	N	%
More parent involvement			3	42.9			1	7.1	3	25.0
More preschools					5	62.5			2	16.7
Improve facilities & equipment							3	21.4	3	25.0
More Hawaiiana							1	7.1	3	25.0
More academics	1	20.0	1	14.3					1	8.3
Add after-school care	1	20.0					1	7.1		
Automatic KS acceptance from preschool	2	40.0								
More language arts			1	14.3			1	7.1		
More social skills training							2	14.3		
Specific activities					1	12.5	1	7.1		
Add enrichment program	1	20.0								
Earlier sign-in times					1	12.5				
Free field trips							1	7.1		
Expand KEEP to Nanakuli Elementary School					1	12.5				
Less Sesame Street							1	7.1		
Lunch							1	7.1		
More math			1	14.3						
More motor skills			1	14.3						
More outdoor play							1	7.1		
Column Total	5	100.0	7	100.0	8	100.0	14	100.0	12	100.0

Table 9

Parental Satisfaction with Preschool Program by KS/BE Site

SATISFACTION	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA		ALL KS/BE SITES	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	13	100.0	17	89.5	18	100.0	18	94.7	16	94.1	82	95.3
Conditional yes			1	5.3							1	1.2
Conditional no			1	5.3					1	5.9	2	2.3
No							1	5.3			1	1.2
Column Total	13		19		18		19		17		86	

Differences among sites are not significant at the .05 level.
Number of missing observations = 14

Table 10

Parents' Aspirations for Children's Schooling by KS/BE Site

ASPIRATION LEVEL	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
High school graduate	4	30.8	8	42.1	5	27.8	5	26.3	4	22.2	26	29.9
Community college/ 2 years of college					1	5.6	4	21.1			5	5.7
College graduate/ BA degree	9	69.2	11	57.9	12	66.7	10	52.6	10	55.6	52	59.8
Professional/ graduate school									4	22.2	4	4.6
Column Total	13		19		18		19		18		87	

Differences among sites are significant at the .05 level. Number of missing observations = 13

Table 11

Parents' Expectations for Children's Schooling by KS/BE Site

EXPECTATION LEVEL	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
High school graduate	4	30.8	11	57.9	6	33.3	8	42.1	5	27.8	34	39.1
Community college/ 2 years of college					1	5.6	3	15.8	2	11.1	6	6.9
College graduate/ BA degree	9	69.2	8	42.1	11	61.1	7	36.8	7	38.9	42	48.3
Professional/ graduate school							1	5.3	4	22.2	5	5.7
Column Total	13		19		18		19		18		87	

Differences among sites are not significant at the .05 level. Number of missing observations = 13

Table 12

Parents' Aspirations for Children's Grades by KS/BE Site

ASPIRATION LEVEL	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA		ALL KS/BE SITES	
	N	%	N	%	N	%	N	%	N	%	N	%
A's	7	53.8	11	57.9	10	55.6	6	31.6	8	44.4	42	48.3
B's	6	46.2	4	21.1	8	44.4	9	47.4	10	55.6	37	42.5
C's			4	21.1			4	21.1			8	9.2
Column Total	13		19		18		19		18		87	

Differences among sites are not significant at the .05 level. Number of missing observations = 13

Table 13

Parents' Expectations for Children's Grades by KS/BE Site

ASPIRATION LEVEL	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA		ALL KS/BE SITES	
	N	%	N	%	N	%	N	%	N	%	N	%
A's	5	38.5	7	36.8	4	22.2	3	15.8	6	33.3	25	28.7
B's	8	61.5	8	42.1	13	72.2	14	73.7	9	50.0	52	59.8
C's			4	21.1	1	5.6	2	10.5	3	16.7	10	11.5
Column Total	13		19		18		19		18		87	

Differences among sites are not significant at the .05 level. Number of missing observations = 13

Table 14

Children's Gender by KS/BE Site

	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA		ALL KS/BE SITES	
	N	%	N	%	N	%	N	%	N	%	N	%
GENDER												
Female	10	50.0	10	50.0	11	55.0	11	55.0	8	42.1	50	50.5
Male	10	50.0	10	50.0	9	45.0	9	45.0	11	57.9	49	49.5
Column Total	20		20		20		20		19		99	

Differences among sites are not significant at the .05 level. Number of missing observations = 1

Table 15

Child's Ethnicity by KS/BE Site

	ULUPONO		NANAIKAPONO		NANAKULI		WAIHEE		ANAHOLA		ALL KS/BE SITES	
	N	%	N	%	N	%	N	%	N	%	N	%
ETHNICITY												
Black			1	5.3							1	1.0
Filipino			2	10.5			1	5.0			3	3.0
Hawaiian			1	5.3	5	25.0	5	25.0	4	20.0	15	15.2
Pt. Hawaiian	20	100.0	12	63.2	15	75.0	9	45.0	14	70.0	70	70.7
Japanese							1	5.0			1	1.0
Portuguese			1	5.3			2	10.0			3	3.0
White			2	10.5			2	10.0	1	5.0	5	5.1
Other									1	5.0	1	1.0
Column Total	20		19		20		20		20		99	

Differences among sites are not significant at the .05 level. Number of missing observations = 1

Table 16

Language Used at Home with Child by KS/BE Site

LANGUAGE	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
English	13	100.0	18	94.7	18	100.0	19	100.0	18	100.0	86	98.9
Spanish			1	5.3							1	1.1
Column Total	13		19		18		19		18		87	

Differences among sites are not significant at the .05 level. Number of missing observations = 14

Table 17

Children's Health Problems by KS/BE Site

HEALTH PROBLEM	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
No problems	12	92.3	16	84.2	16	88.9	12	63.2	11	64.7	67	77.9
Allergies							1	5.3	2	11.8	3	3.5
Asthma	1	7.7	1	5.3	1	5.6	1	5.3	3	17.6	7	8.1
Ear-related			1	5.3	1	5.6	3	15.8			5	5.8
Febrile seizures			1	5.3			1	5.3			2	2.3
Other							1	5.3	1	5.9	2	2.3
Column Total	13		19		18		19		17		86	

Differences among sites are not significant at the .05 level. Number of missing observations = 14

Table 18

Marital Status of Children's Parents by KS/BE Site

MARITAL STATUS	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
Single	6	46.2	1	5.3	4	22.2	2	10.5	2	11.1	15	17.2
Married	6	46.2	18	94.7	13	72.2	16	84.2	14	77.8	67	77.0
Divorced	1	7.7			1	5.6			1	5.6	3	3.4
Separated									1	5.6	1	1.1
Widowed							1	5.3			1	1.1
Column Total	13		19		18		19		18		87	

Differences among sites are not significant at the .05 level. Number of missing observations = 13

Table 19

Parental Presence by KS/BE Site

PARENTAL PRESENCE	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
Both parents	7	53.8	18	94.7	12	63.2	17	89.5	15	83.3	69	78.4
Mother only	5	38.5	1	5.3	5	26.3			3	16.7	14	15.9
Neither parent	1	7.7			2	10.5	2	10.5			5	5.7
Column Total	13		19		19		19		18		88	

Differences among sites are not significant at the .05 level. Number of missing observations = 12

Table 20

Legal Custody of Children by KS/BE Site

LEGAL CUSTODIAN	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
Both parents	6	46.2	18	94.7	14	73.7	17	89.5	14	77.8	69	78.4
Mother only	6	46.2	1	5.3	4	21.1	1	5.3	3	16.7	15	17.0
Father only					1	5.3	1	5.3	1	5.6	3	3.4
Other relative	1	7.7									1	1.1
Column Total	13		19		19		19		18		88	

Differences among sites are not significant at the .05 level. Number of missing observations = 12

Table 21

AFDC/GA Status by KS/BE Site

AFDC/GA STATUS	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
Yes	7	53.8	3	15.8	6	31.6	2	10.0	6	33.3	24	27.0
No	6	46.2	16	84.2	13	68.4	18	90.0	12	66.7	65	73.0
Column Total	13		19		19		20		18		89	

Differences among sites are significant at the .05 level. Number of missing observations = 13

Table 22

Self-reported Parental Income by KS/BE Site

INCOME	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
$2,500	1	9.1	1	5.6	5	27.8			1	5.6	8	9.5
$6,250	3	27.3	2	11.1			2	10.5	1	5.6	8	9.5
$8,750	2	18.2	1	5.6	1	5.6			3	16.7	7	8.3
$12,500	2	18.2	2	11.1	3	16.7	4	21.1	4	22.2	15	17.9
$17,500	1	9.1	1	5.6	1	5.6	4	21.1	2	11.1	9	10.7
$22,500	2	18.2	3	16.7	3	16.7	2	10.5	2	11.1	12	14.3
$30,000			6	33.3	1	5.6	5	26.3	3	16.7	15	17.9
$42,500			2	11.1	3	16.7	2	10.5	1	5.6	8	9.5
$60,000					1	5.6			1	5.6	2	2.4
Column Total	11		18		18		19		18		84	ERR

Mean: $19,717
Median: $17,500

Differences among sites are not significant at the .05 level.
Number of missing observations = 16

Table 23

Self-reported Household Income by KS/BE Site

INCOME	ULUPONO N	ULUPONO %	NANAIKAPONO N	NANAIKAPONO %	NANAKULI N	NANAKULI %	WAIHEE N	WAIHEE %	ANAHOLA N	ANAHOLA %	ALL KS/BE SITES N	ALL KS/BE SITES %
$2,500	1	9.1	1	5.6	2	12.5					4	4.9
$6,250	3	27.3	2	11.1			2	10.5	1	5.6	8	9.8
$8,750	1	9.1							3	16.7	4	4.9
$12,500	1	9.1	2	11.1	3	18.8	4	21.1	3	16.7	13	15.9
$17,500	2	18.2					3	15.8	1	5.6	6	7.3
$22,500	3	27.3	4	22.2	2	12.5	1	5.3	2	11.1	12	14.6
$30,000			5	27.8	2	12.5	7	36.8	3	16.7	17	20.7
$42,500			3	16.7	5	31.3	2	10.5	3	16.7	13	15.9
$60,000			1	5.6	2	12.5			2	11.1	5	6.1
Column Total	11		18		16		19		18		82	

Mean: $24,329
Median: $22,500

Differences among sites are not significant at the .05 level.
Number of missing observations = 18

C. Results from Hearing Screening

The number and percent of children assigned to each category of hearing screening result by each of the screening methods are shown in Figure 1. The correlations among the screening methods are presented in Table 24. The cross-tabulation of the hearing screening results by screening method is shown in Table 25; the congruence among the findings of these screening methods is shown in Figure 2. In this figure (a Venn diagram) the size of the circles is approximately proportional to the number of children who "failed" each of the screening methods. The overlap of the circles indicates congruence of findings. For example, 25 children failed all three screening methods, 28 failed the otoscopy only, 10 failed otoscopy and audiometry but not the tympanometry, and so forth.

Table 24

Correlations Among Screening Methods

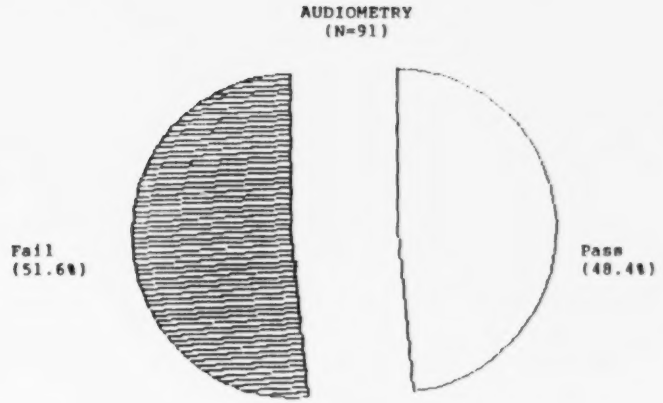
	Audiometry	Tympanometry	Otoscopy
Audiometry	--		
Tympanometry	0.64	--	
Otoscopy	0.07	-0.01	--
Referral status	0.82	0.65	0.38

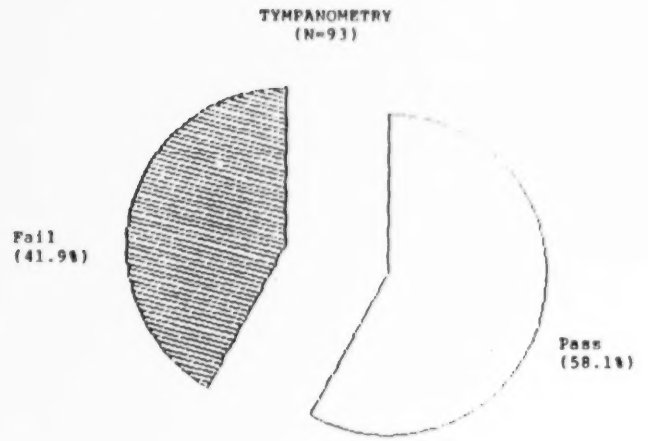
The three screening methods produced results that were in substantial agreement, although otoscopy identifies a larger proportion of children as having questionable screening results. The summary clinical judgment of the audiologists (Referral Status in Table 24 and Figure 1) is based on a professional interpretation and integration of the findings from the three screening techniques.

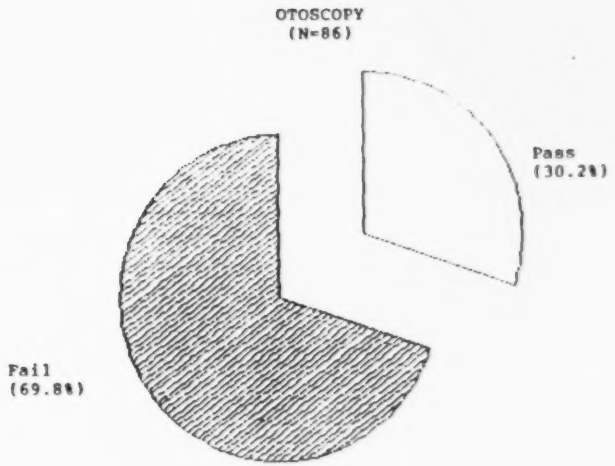
Differences in family characteristics of children who passed or failed the hearing screening were tested for significance (discrete variables by chi square and continuous variables by single-classification analysis of variance). These results are presented for each screening method in Table 26. Hawaiian children were more likely than non-Hawaiian children to fail the hearing screening.

The differences in performance on the educational tests of children passing and failing the hearing screening are shown in Figures 3 through 6. Each figure displays the results for a different screening technique. There was a pattern of significant relationship between test performance and hearing-screening results when language skills were tested.

These findings of statistical significance tend to validate the hearing-screening methodology. False positives would not be associated with lower test scores. Further, the fact that these significant differences were found with tests administered in the Spring (some seven or eight months after the hearing screening) focusses attention on the long-term educational implications of these findings.







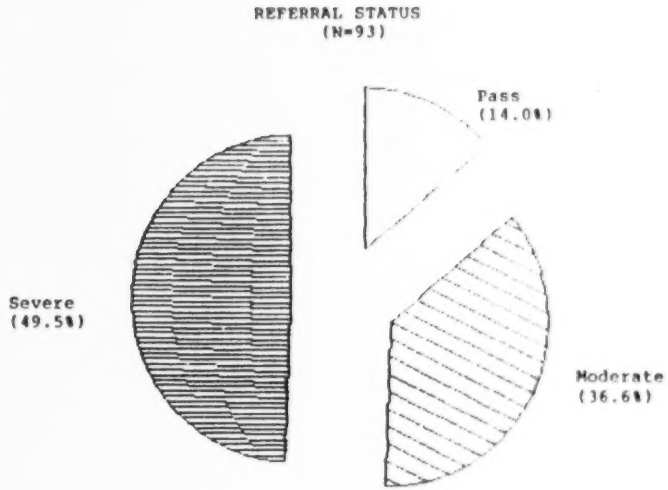


Figure 1. Hearing screening results by method.

Table 25

Cross-tabulation of Results by Screening Method

	AUDIOMETRY				
	Pass		Fail		
	OTOSCOPY		OTOSCOPY		TOTAL
	Pass	Fail	Pass	Fail	
TYMPANOMETRY					
Pass	12	28	3	10	53
Fail	2	2	9	25	38
Total	14	30	12	35	91

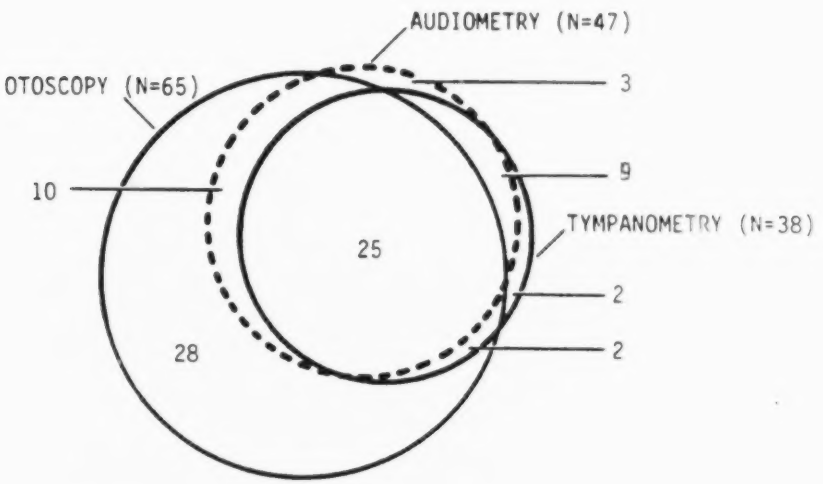


Figure 2. Congruence among "fail" findings of screening methods.

Table 26

Screening Method Results and Family Characteristics*

FAMILY CHARACTERISTICS	AUDIO-METRY	TYMPANO-METRY	OTOSCOPY	REFERRAL STATUS
Age			X	
Gender				
Health				
Race (Hwn. vs. non-Hwn.)	X			X
Custody				
Previous preschool experience				
Parents' presence in household				
Parents' marital status				
Parents' DSSH status				
Parents' income				
Household income				
Percapita income				
Father's education				
Mother's education				
Birthweight				
Household size				
Sibling set size				
Birthorder				
Number of children aged 0-5 in the household				
SES				
Parents' aspirations for student's grades				
Parents' expectations for student's grades			X	
Parents' aspirations for student's schooling				
Parents' expectations for student's schooling				
Change in parents' employment status				
Child's change of household (Moved Y/N)				
Persons entered into household (Y/N)				
Persons left household (Y/N)				

* X indicates a statistically significant relationship (chi square or r) between screening method results and the family characteristic (.05 level)

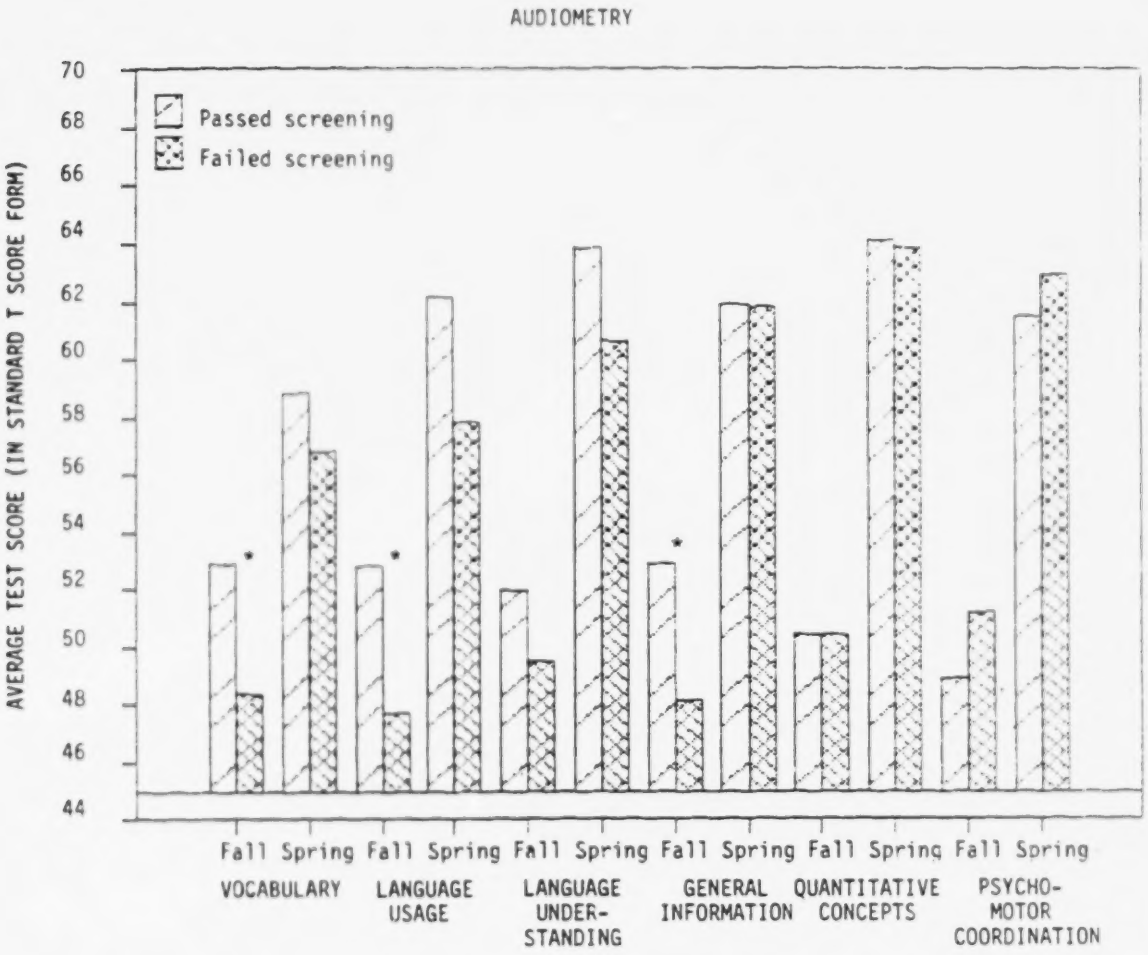


Figure 3. Comparative test performance of preschoolers who "pass" and "fail" the audiometry screening.

*Difference between mean test score of hearing "pass" and "fail" groups significant at the .05 level

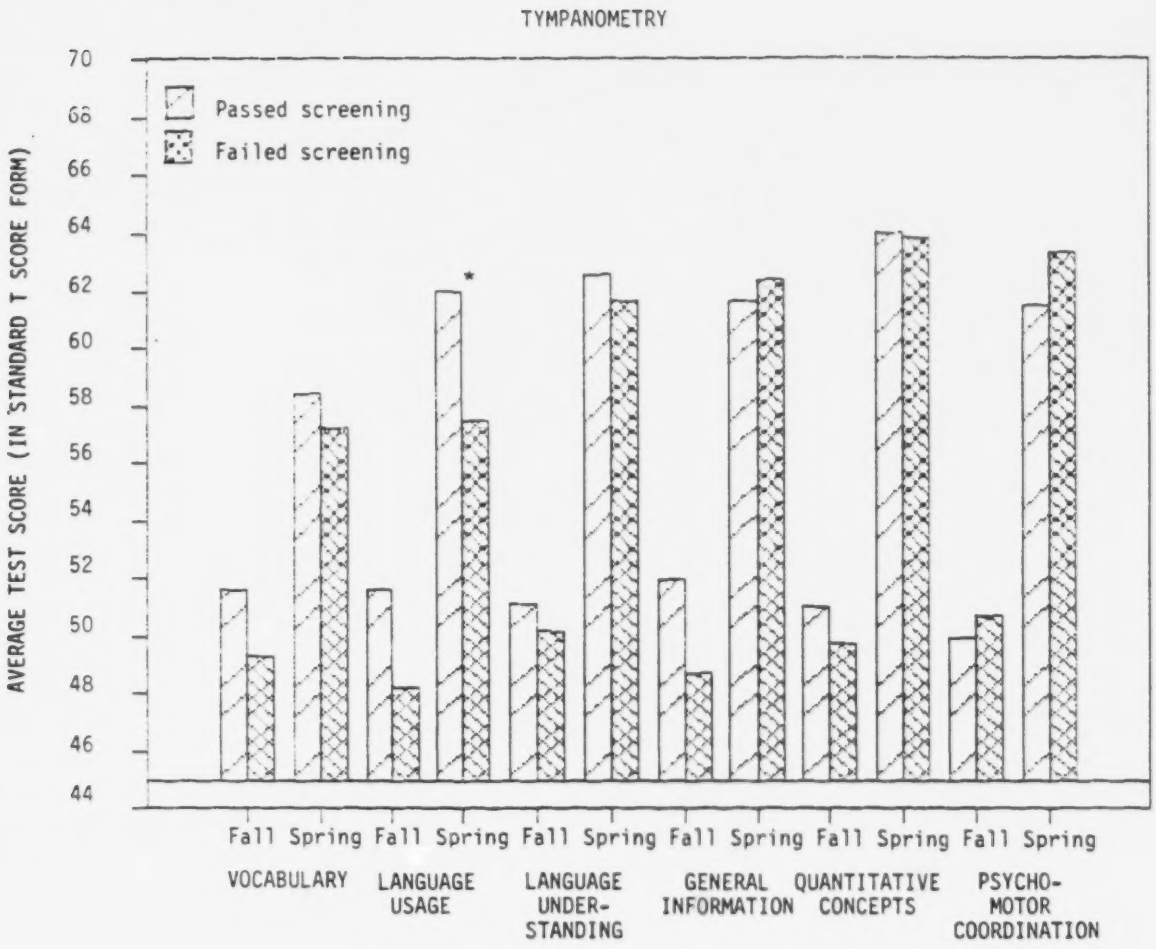


Figure 4. Comparative test performance of preschoolers who "pass" and "fail" the tympanometry screening.

*Difference between mean test score of hearing "pass" and "fail" groups significant at the .05 level

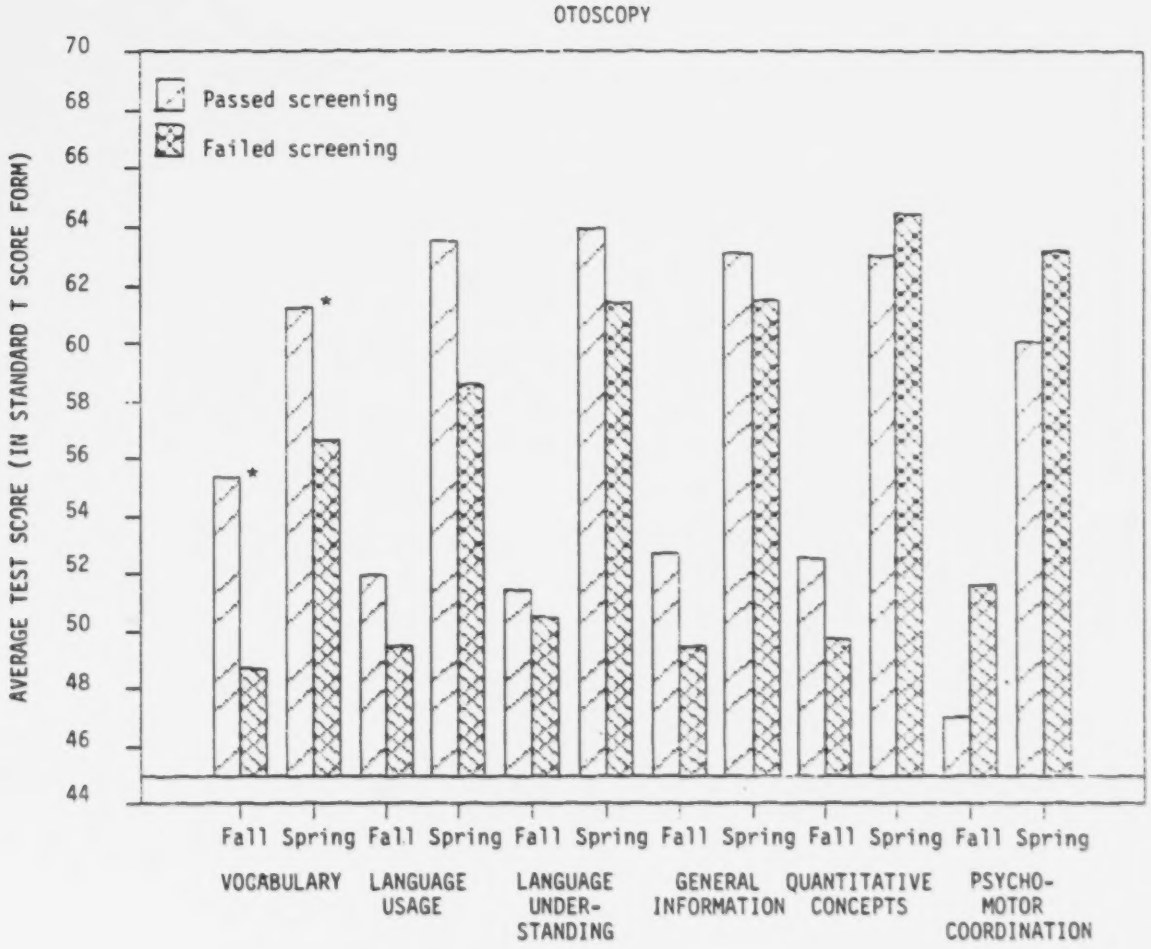


Figure 5. Comparative test performance of preschoolers who "pass" and "fail" the otoscopy screening.

*Difference between mean test score of hearing "pass" and "fail" groups significant at the .05 level

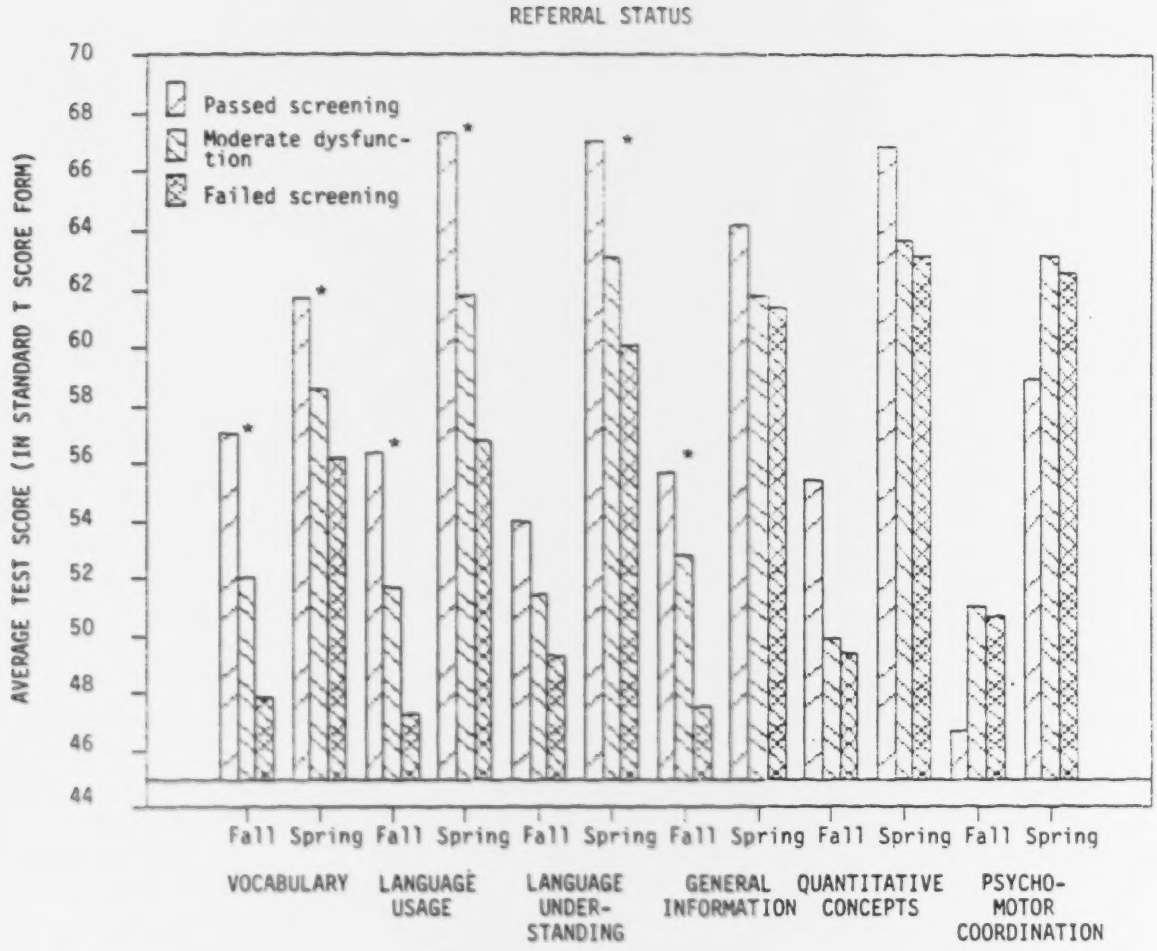


Figure 6. Comparative test performance of preschoolers by hearing screening referral status.

*Difference between mean test score of hearing "pass" and "fail" groups significant at the .05 level

D. Results from Educational Testing

The average score and standard deviation for each test, at each site, are given in Table 27. These data are given for Fall and Spring scores as well as for Growth scores (Spring score minus Fall score). The significance of differences of test score averages among the five KS/BE preschool sites is indicated.

Correlations among the tests, Fall, Spring, and Growth scores, are reported in Table 28. These correlations give some indication of the reliability and validity of these measures.

The bar graph in Figure 7 shows the comparative growth on the various skills tested. The height of the bars is plotted in standardized (T-score) scores. Figure 7 is designed to show the pattern of educational achievement in the KS/BE preschools. For example, there appears to be more growth in quantitative concepts than in vocabulary. Such patterns may reflect the instructional emphases of these schools or the readiness of the preschoolers for different types of learning. In any case, they provide curriculum planners with evidence regarding the relative progress being made towards various educational objectives.

The frequency polygons presented in Figure 8 show the Fall and Spring distributions of test scores (standardized T-scores) for each test.

The performance of KS/BE preschoolers relative to norm groups is displayed in Figures 9 and 10. For the vocabulary test (Figure 10) both State and national norms were available because

this test has been used statewide by the Hawaii State Department of Education EPSS program. For tests in the CIRCUS battery, only national norms are available.

The relationships between family characteristics (obtained from parent interviews) and test scores were tested for significance. The results are given in Table 29. Only five of the 29 family characteristics examined show a pattern of significant relationships with the Fall and Spring test scores. Generally, older children and children from homes with fewer children performed better on the tests. However, children of higher birthorders (later-born) were found to perform better than children of lower birthorders (earlier-born). SES had a significant, positive relationship with five of the Fall tests and three of the Spring tests.

A number of household-stability variables were examined. Parental marital status, parent-presence in the home, and changes in household composition were not significantly related to test performance.

Parents' aspirations and expectations for their children's level of schooling and class grades were, perhaps surprisingly, not significantly related to their children's performance on the tests.

Table 27

Average Test Scores by Site

	VOCABULARY		LANGUAGE USAGE		LANGUAGE UNDERSTANDING		GENERAL INFORMATION		QUANTITATIVE CONCEPTS		PSYCHO-MOTOR COORDINATION	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
ALL KS/BE SITES												
Fall	81.1	17.0	28.3	9.8	14.3	3.3	20.7	4.3	20.8	5.2	25.5	6.9
Spring	94.3	11.5	37.9	11.4	18.3	3.0	25.8	3.3	27.8	5.7	34.0	6.5
Growth [a]	12.7	13.5	9.5	8.1	3.9	3.2	5.1	3.4	7.1	4.7	8.5	6.1
ULUPONO												
Fall	72.0*	16.4	25.7*	8.3	13.7*	3.0	20.4	4.8	22.0	6.3	26.9	7.0
Spring	93.7	11.5	37.8	8.5	17.9	3.6	26.4	2.8	27.3	6.3	34.7	6.8
Growth [a]	20.3*	11.3	11.9*	7.2	4.1	2.9	6.1	3.3	4.9*	4.5	7.2*	4.4
NANAIKAPONO												
Fall	73.6*	14.2	24.3*	7.2	12.7*	2.9	19.1	4.6	18.5	3.8	26.0	6.5
Spring	91.7	6.2	34.5	10.3	18.2	2.8	25.1	2.7	27.4	4.8	31.2	5.7
Growth [a]	17.9*	13.2	10.2*	6.4	5.6	3.5	6.1	4.2	8.9*	3.9	5.2*	6.8
NANAKULI												
Fall	83.0*	18.3	27.0*	11.2	14.2*	3.4	21.7	4.0	21.6	5.0	25.6	7.6
Spring	97.5	14.4	38.9	11.8	18.1	2.2	26.8	3.2	28.7	5.4	35.6	6.5
Growth [a]	14.0*	14.2	12.3*	8.2	3.7	2.9	5.1	3.3	7.1*	4.3	10.3*	5.7
WAIHEE												
Fall	87.5*	15.9	32.6*	9.7	14.4*	3.0	21.1	4.6	20.9	4.1	26.0	8.1
Spring	93.4	9.8	39.8	12.4	17.7	3.2	24.9	4.5	25.8	5.8	32.5	6.1
Growth [a]	5.4*	11.5	7.4*	7.8	3.1	3.0	3.8	2.6	5.3*	4.0	7.0*	5.6
ANAHOLA												
Fall	89.4*	13.7	32.7*	9.9	16.4*	3.6	21.2	3.5	21.1	6.1	23.2	5.4
Spring	95.7	13.8	38.4	13.6	19.4	3.2	25.8	2.9	30.0	5.7	36.0	6.4
Growth [a]	6.3*	11.4	5.8*	9.1	3.0	3.1	4.6	3.0	8.9*	5.6	12.8*	4.8

* Indicates average differences significant at .05 level.

[a] Growth = Spring mean score minus Fall mean score

Table 28

Correlations Among Test Scores

		VOCABULARY			LANGUAGE USAGE			LANGUAGE UNDERSTANDING			GENERAL INFORMATION			QUANTITATIVE CONCEPTS			PSYCHO-MOTOR COORDINATION		
		Fall	Spring	Growth	Fall	Spring	Growth	Fall	Spring	Growth	Fall	Spring	Growth	Fall	Spring	Growth	Fall	Spring	Growth
FALL	VOCAB																		
SPRING	VOCAB	0.61*																	
GROWTH	VOCAB	-0.74*	0.08																
FALL	LANG USE	0.61*	0.51*	-0.32*															
SPRING	LANG USE	0.52*	0.65*	0.10	0.72*														
GROWTH	LANG USE	-0.05	0.26	0.27*	-0.23	0.51*													
FALL	LANG UND	0.40*	0.43*	-0.13	0.64*	0.55*	-0.02												
SPRING	LANG UND	0.32*	0.45*	-0.02	0.50*	0.59*	0.18	0.51*											
GROWTH	LANG UND	-0.12	-0.03	0.13	-0.21	-0.03	0.20	-0.58*	0.41*										
FALL	GEN INFO	0.54*	0.57*	-0.20	0.56*	0.61*	-0.14	0.54*	0.60*	-0.14									
SPRING	GEN INFO	0.35*	0.47*	-0.03	0.62*	0.60*	-0.18	0.53*	0.56*	-0.16	0.65*								
GROWTH	GEN INFO	-0.35*	-0.26	0.21	0.13	0.06	-0.08	-0.09	-0.11	0.01	-0.68*	0.12							
FALL	QUAN CON	0.28*	0.41*	0.01	0.52*	0.50*	0.01	0.58*	0.54*	-0.01	0.53*	0.66*	-0.10						
SPRING	QUAN CON	0.29*	0.33*	-0.08	0.61*	0.47*	-0.08	0.50*	0.51*	0.07	0.49*	0.69*	0.03	0.62*					
GROWTH	QUAN CON	0.06	-0.04	-0.12	0.19	0.03	-0.16	-0.15	0.07	0.08	-0.03	0.11	0.14	-0.35*	0.51*				
FALL	P-M COOR	0.08	0.12	0.02	0.27*	0.29*	0.06	0.21	0.31*	0.09	0.25	0.39*	0.00	0.52*	0.48*	0.03			
SPRING	P-M COOR	0.05	0.17	0.09	0.25	0.24	0.00	0.24	0.18	-0.07	0.28*	0.41*	0.03	0.43*	0.53*	0.17	0.59*		
GROWTH	P-M COOR	-0.02	0.04	0.08	-0.04	-0.07	-0.06	0.01	-0.14	-0.16	-0.02	0.00	0.03	-0.12	0.02	0.16	-0.50*	0.48*	

* Indicates correlation significant at the .05 level

** Growth = Spring score minus Fall score

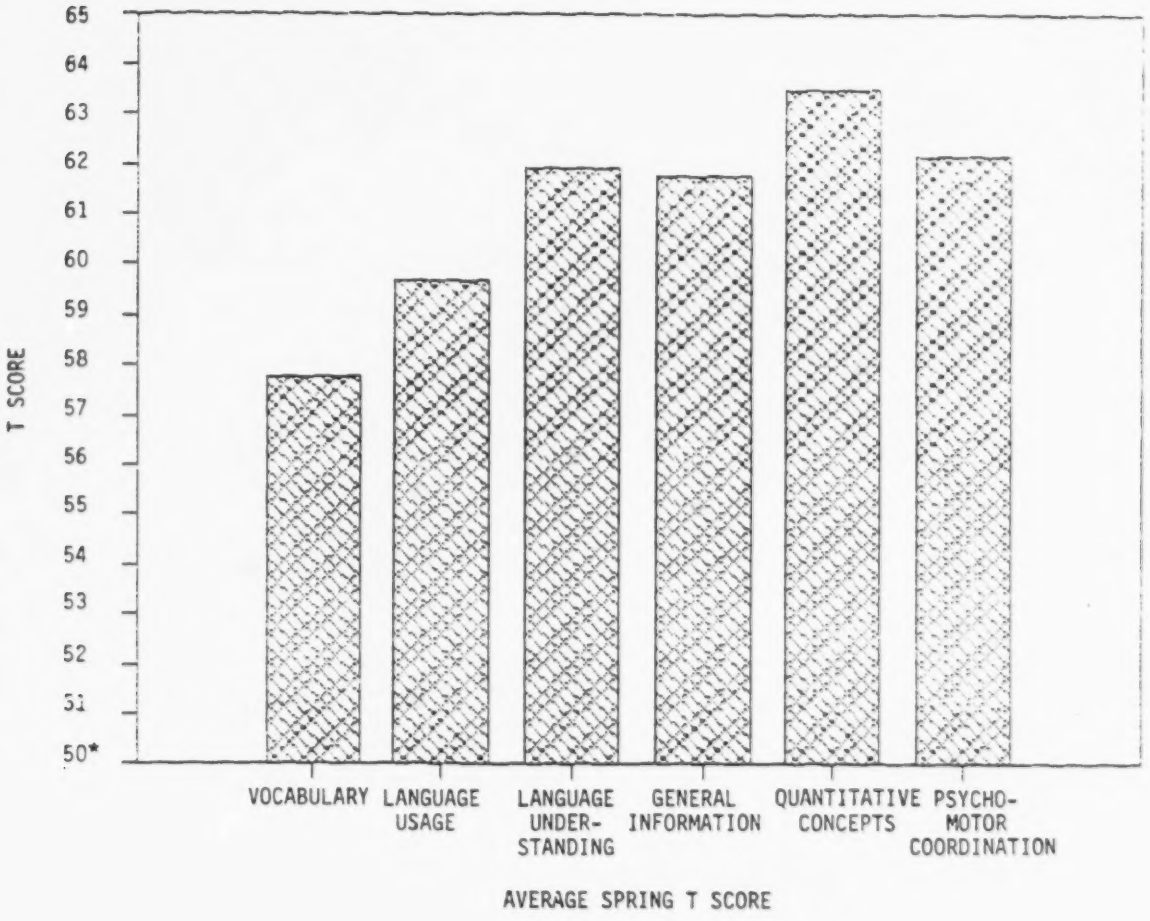


Figure 7. Educational growth: Fall to Spring average test scores

*T-score of 50 represents average Fall score for each test

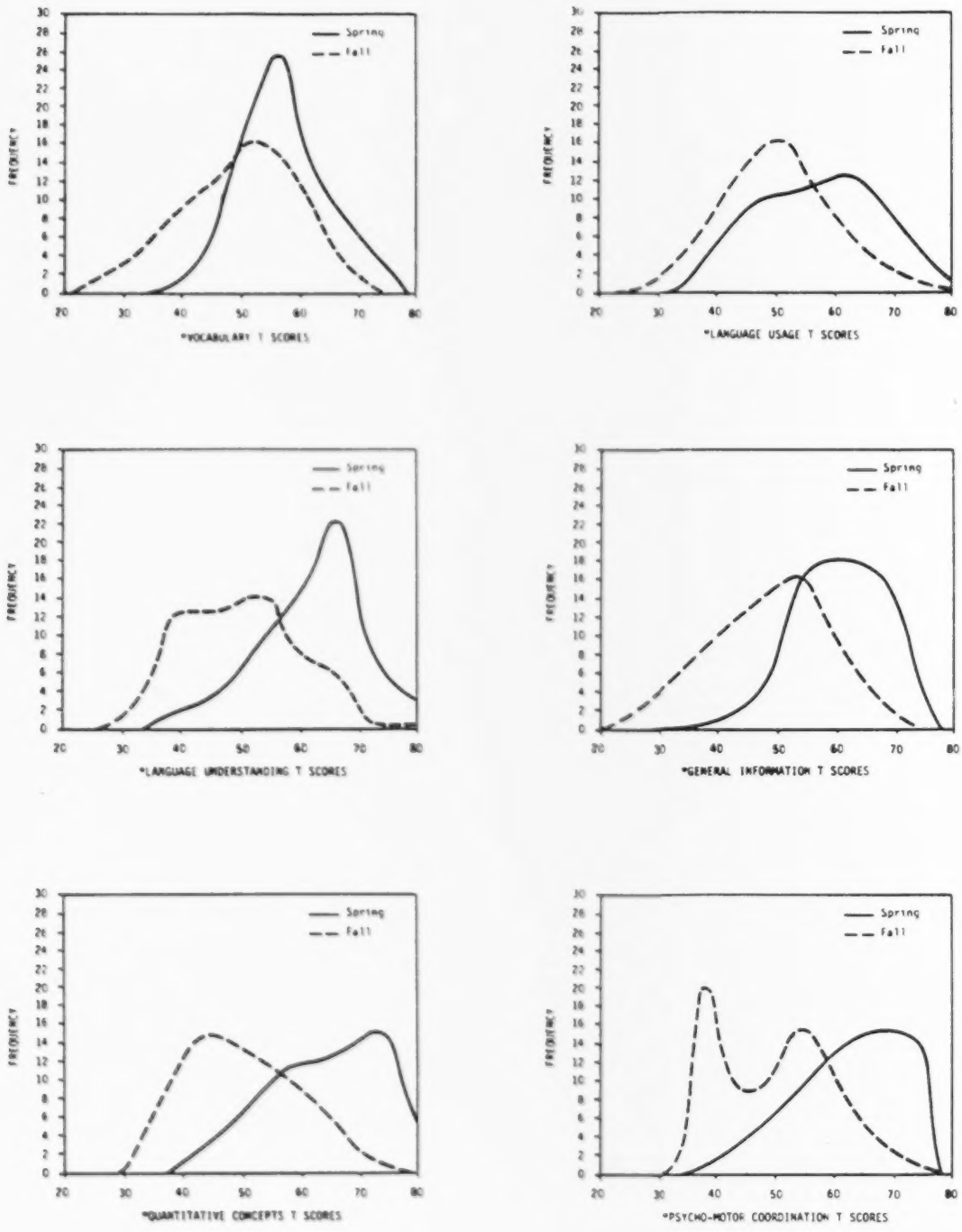


Figure 8. Educational growth: Fall and Spring test-score distributions.

*T-scores based on distributions of Fall scores

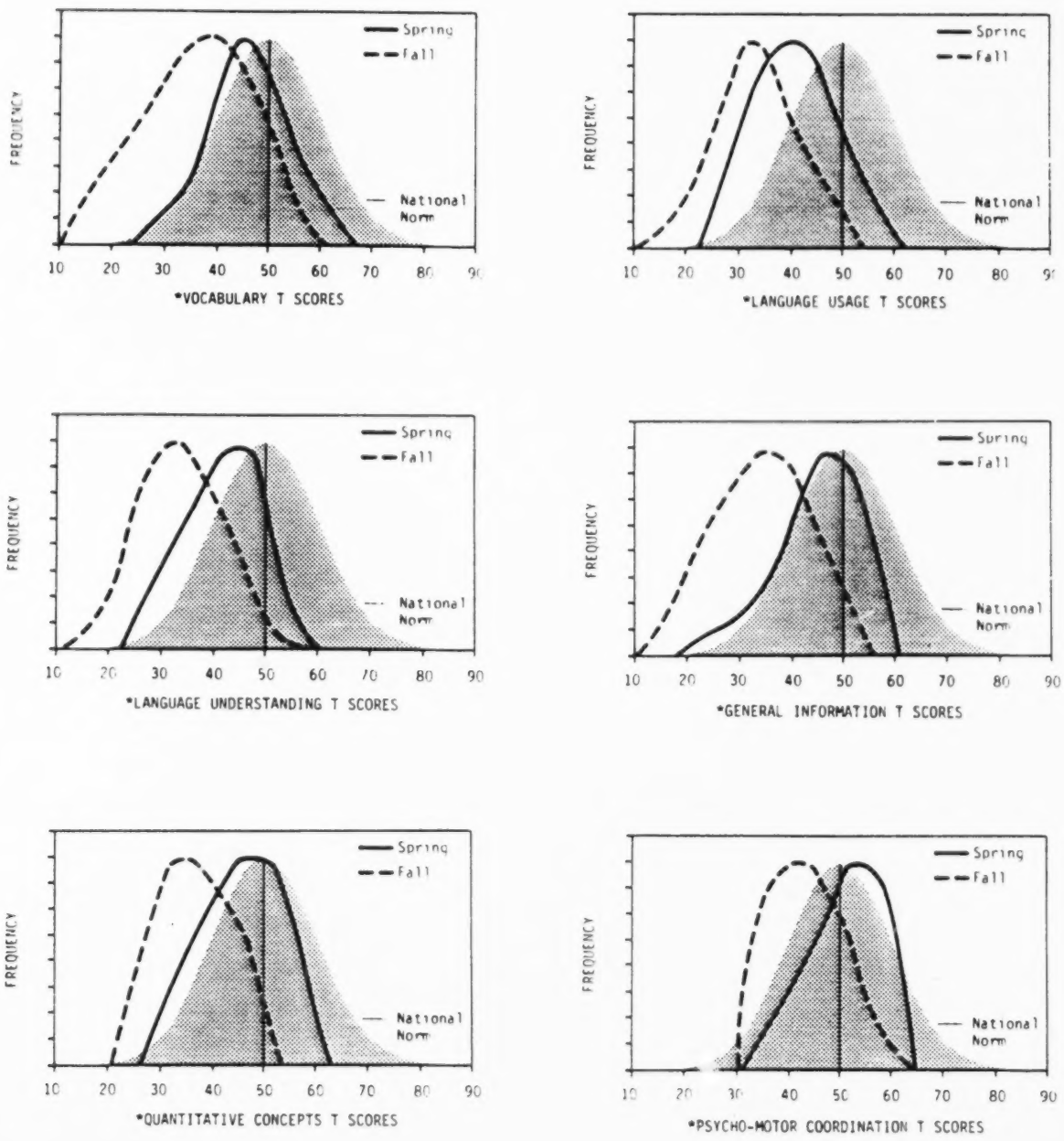


Figure 9. Test performance of KS/BE preschoolers relative to national norms.

*Test scores based on mid-year (January) preschool national norms

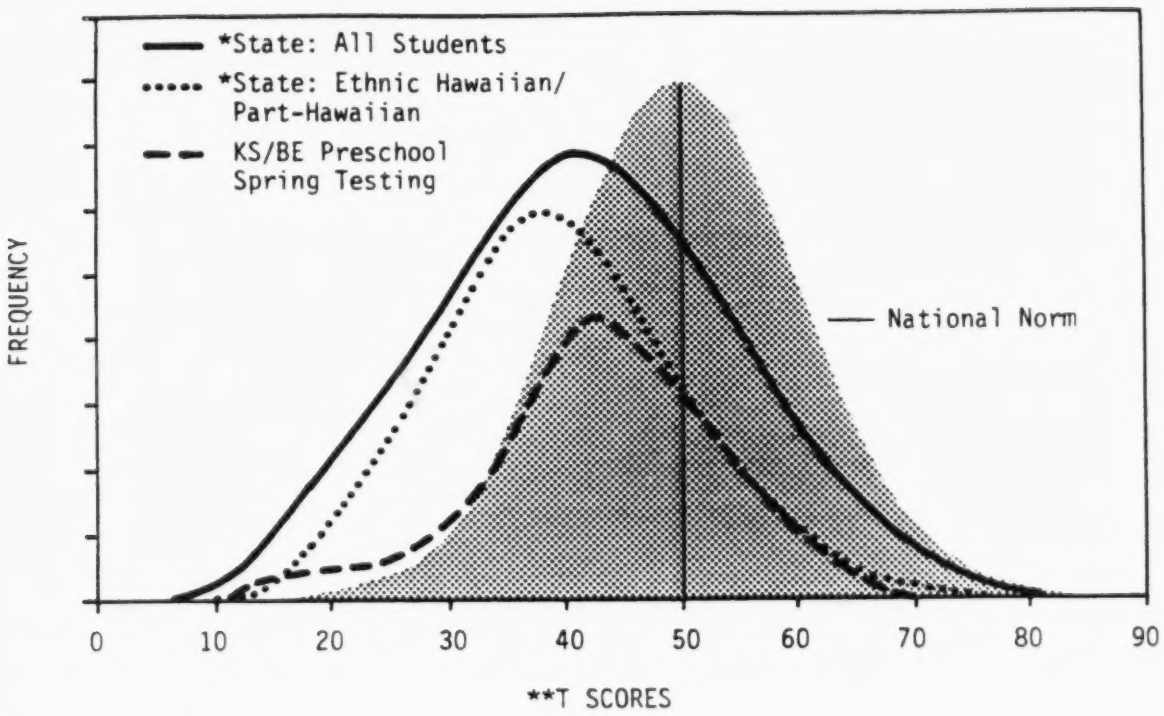


Figure 10. The vocabulary test performance of KS/BE preschoolers relative to the national norm, all students statewide, and ethnic Hawaiian/part-Hawaiian students statewide.

*Entering kindergarten students

**T-scores are standardized scores, based on national norms (Spring preschool testing)

Table 29

Test Results and Family Characteristics*

Family Characteristics	VOCABULARY		LANGUAGE USAGE		LANGUAGE UNDERSTANDING		GENERAL INFORMATION		QUANTITATIVE CONCEPTS		PSYCHO-MOTOR COORDINATION	
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Age			X	X	X	X	X	X	X	X	X	X
Gender											X	X
Race (Hwn. vs. non-Hwn.)			X	X			X					
Health												
Custody												
Previous preschool experience												
Parents' presence in household												
Parents' marital status												
Parents' AFDC/GA status												
Parent's income			X		X							
Household income					X							
Percapita income	X	X	X		X					X		
Father's education			X		X	X						
Mother's education	X	X	X		X							
Birthweight												
Household size												
Sibling set size												
Birthorder			X	X	X	X	X	X		X	X	
Number of children aged 0-5 in household		X	X	X		X		X			X	
Fall SES	X	X	X	X	X							
Spring SES	X		X		X							
Parents' aspirations for student's grades				X								
Parents' expectations for student's grades												
Parents' aspirations for student's schooling												
Parents' expectations for student's schooling												
Change in parents' employment status												
Child's change of household (Moved Y/N)												
Persons entered into household (Y/N)												
Persons left household (Y/N)												

* X indicates a statistically significant relationship (chi square or r) between test scores and the family characteristic (.05 level)

IV. DISCUSSION

A. Prenatal-to-Preschool Programs

Program evaluation efforts during the 1985-86 school year for the 0-to-3 age portion of the pre-kindergarten educational program focussed on two objectives: (a) to improve the quality and efficiency of data-collection efforts, and (b) to survey former participants of the Kupulani program about their experiences in the program.

Questions About Pregnancy Test

An analysis of the Questions About Pregnancy Test indicates that this instrument is in need of revision or replacement. The format and wording of the test is poor from a psychometric standpoint, and, as the distribution of responses indicates, the difficulty level and content are often inappropriate. It is also evident that the data-collection procedures used with this instrument have not been consistent. This item-analysis indicates that the test is of inadequate quality for either program-evaluation or curriculum-development purposes. It has been proposed that this instrument be replaced or extensively revised.

A search of the literature has failed to identify any other existing published instrument that would serve the purpose of this test. We have therefore suggested that a cooperative effort be initiated to construct a sound assessment instrument

(a Maternal Information Survey). We suggest that the curriculum developer/trainers identify those specific elements of information that the program intends to convey to participants. These items can then be cast into a draft instrument for review and pilot-testing. It seems likely that the mode of administration would be an interview rather than a paper-and-pencil response-document. This format places a special importance on the training of home visitors in the administration technique. We hope to work with the curriculum developer/trainers on this task during the 1986-87 school year.

The Remote Data-Entry System

A Forms Consolidation Committee worked diligently to consolidate the many redundant forms that had accumulated in Kupulani operations over the years. In consultation with all participating staff, the essential data elements were identified and consolidated into a single data-collection and management system. This system (the Full Screen Product or FSP) is designed to allow remote data-entry into the mainframe computer on the KS/BE campus. These data can then be retrieved for case- and program-management as well as for training, research, and program evaluation purposes. Data retrieval can be accomplished either on-site or on-campus. A consultant was employed to develop the software and a manual for use of the system. Field workers have begun training in the use of the FSP system. Equipment unavailability and installation obstacles are currently being

addressed. Unfortunately, after the data-collection streamlining work of the Forms Consolidation Committee was completed and FSP was developed, the use of old forms continued. It has been proposed that the various staff members involved work together to establish procedures for rationalizing the development and use of data-collection instruments and the coordination of their use.

Kupulani Follow-Up Participant Interviews

The results of this follow-up telephone survey indicate very positive attitudes toward the project on the part of the former Kupulani participants. Though we were able to contact only 29 of the 137 former participants, the fact that all of the respondents interviewed recommend participation in the program to a friend is striking.

Participants tend to keep the T-shirts, quilts, and printed materials. If participants no longer have these materials in their possession, it is likely that they have given them to friends or family members. All but one of the respondents report sharing information with others. Most respondents report using information with children other than the Kupulani child. These findings indicate there is an extensive diffusion of program effect through the informal social networks of program participants.

Participants report hearing about the program through informal contacts rather than from professional or agency sources. The natural channel for reaching prospective

participants is through these informal social networks. Kupulani program administrators should consider the desirability of focussing their efforts on reaching informal-network leaders in the community rather than developing further professional/agency referral channels.

A goal of the Kupulani program is to enhance the likelihood of school success among the participant children. In general, respondents think their children are doing well in school and are satisfied with their performance. Parents report that their children like school and get along well with their teachers and with the other students. Most parents aspire for their children to graduate from a four-year college, although their expectations are slightly lower.

Responses to the follow-up interview and results from the Questions About Pregnancy Test indicate that much of the content of the Kupulani curriculum is not new to participants. Information about perinatal care and childbirth is among that most likely to be new to the participants.

Kupulani staff and curriculum developers intend the program to be compatible with the Hawaiian culture. However, this aspect of the program is not reported as a strength, nor is such a feature remembered, by former participants. Apparently, the Hawaiian cultural content and compatibility is not as strong a component as it is thought to be by curriculum developers.

The evaluation plan for the 1986-87 school year specifies conducting follow-up interviews as clients leave the program. It

also prescribes further study of the diffusion of information through informal networks.

If the major objective of the program is to increase parents' knowledge of methods for improving the chances for educational success of their children, it should be possible to develop a method for assessing acquisition of this information. The development of such an assessment must begin with a clear statement of tangible program objectives. We propose to develop a single measure, a Maternal Information Survey, to survey the extent to which clients have such information at the initiation of their participation and again at its completion. This instrument is intended to correspond to the educational aims of the prenatal/perinatal curriculum and the quilt/T-shirt curriculum, together with all other educational efforts at Kupulani.

B. Preschool Program

Parent Interviews

Parents' satisfaction with the preschool program, and particularly with the preschool teachers, is high. Parent-reported preschool strengths outnumber weaknesses by a five-to-one margin. The most frequently reported parental recommendations are for more parent involvement and more preschools. The majority of parents want a four-year college education for their children, although parents' expectations are somewhat lower. With the exception of AFDC/GA (public assistance) status, none of the family characteristics is significantly different among sites.

The demographic data obtained from the parent interviews are used in the analysis of hearing-screening results and test performance. Surprisingly, there are very few instances of interaction with the hearing-screening methods. Ethnic-Hawaiian children are more likely to fail the audiometry portion of the hearing screening and to be classified as Severe on the overall referral status.

Age, SES, birthorder, and number of children aged 0-to-5 in the household all show patterns of significant relationship with the test scores. Interestingly, although the number of children in the household is negatively correlated with the test scores, children of higher birthorders (those born later in the sibling set) perform better on the tests.

The most notable outcome of the tests of relationship between family characteristics and test scores may be the non-significance of some relationships. Contrary to expectation, family-stability characteristics, as measured by parents' marital status, parents' presence in the household, custody, and change in the child's household composition, show no significant relationship to test performance. Another noteworthy finding is that parents' expectations and aspirations for their children's schooling and class grades are not significantly related to test performance.

Hearing Screening

The analyses of the hearing screening results yield clear and dramatic findings:

More than three-quarters of the children entering KS/BE preschools fail the hearing screening conducted by the Kapiolani Women's and Children's Medical Center.

Those children who fail this hearing screening, score significantly lower on educational tests of language skills than those who pass. When the educational tests are administered again, at the end of the school year, children who fail the hearing screening upon entry achieve significantly lower scores in language skills.

These findings led us to pursue answers to several questions:

1. **How unusual are the findings of the hearing screening of preschool children at Kamehameha Schools?**

The research literature, especially the most recent literature, indicates that these findings <u>are not</u> unusual. Contemporary studies report that <u>most</u> children experience episodes of "silent" otitis media, that these episodes recur during the preschool years and that the effects on hearing endure for weeks or months following each episode. Further, these research reports suggest that the incidence of both acute and moderate episodes of otitis media is higher for children in particular ethnic minorities, in low income families, and for children who are exposed to greater opportunities for exchange of infection (group care settings, crowded housing, larger numbers of siblings). Many of the factors associated with a higher incidence of this type of hearing dysfunction are characteristic of the population of children served by KS/BE preschools.

2. **Is it likely that these findings are in error?**

Our data offer two means of examining the likelihood of error in the hearing screening: (a) agreement, or lack of agreement among the three screening techniques, and (b) the relationship of the screening results to hearing-competence dependent measures (test scores). In these data, the agreement of the findings among the three screening techniques is striking.

Even though the techniques address very different aspects of audition, they identify the same children to a substantial degree. When the findings produced by the individual techniques

are integrated and interpreted by a professional audiologist, the convergence of results yields a statistically reliable categorization of children by hearing status.

Further evidence of the validity of the hearing-screening findings is apparent in the relationship of these findings to the test performance of the preschoolers. On those tests that one would expect to be most vulnerable to hearing dysfunction (tests of language skills) children who fail the screening score significantly lower than those who pass. This relationship can be observed not only when the tests are administered concurrently with the hearing screening, but also when the same tests are administered again, some eight months later.

The statistical significance of these findings attests to both the reliability and the validity of the hearing screening procedures.

3. Is this incidence of hearing dysfunction unique to Hawaiian children?

The current research literature indicates that the incidence of hearing function found in these data is <u>not</u> unique to Hawaiian children. However, there appears to be an emerging body of research indicating that certain ethnic groups (Native Americans, Pacific Islanders, Eskimos) may be at greater risk than the general population. Truly systematic research on the magnitude and the nature of the relationship between ethnicity and hearing dysfunction in young children appears to be in a preliminary state.

4. Are such findings a function of the screening method used?

These data indicate that the various screening methods generally produce the same findings. To the extent that any one of the techniques yields differing results, that method is otoscopy. However, unlike audiometry and tympanometry, otoscopy is not a direct measure of auditory functioning. Its results take the form of a clinical judgment on the part of the examiner in response to a variety of observed conditions. Each of the screening methods yields a distinct type of data. These data are integrated by a trained specialist, who then assigns a summary referral status. This procedure appears to filter out anomalous results that might be obtained from any one of the screening techniques.

5. Is hearing dysfunction among Hawaiian children related to family characteristics?

There are virtually no significant differences in hearing screening results related to family characteristics in these data. On some variables (such as SES) the range is so small in our population that any significant relationship is precluded. However, among many variables that might be expected to be associated with the incidence of otitis media (such as sibling-set size, birthweight, and number of children aged 0-to-5 in the household) no significant relationships are in evidence.

6. **What is the relation of hearing dysfunction to performance on educational tests?**

Though there are variations by screening method and test, a clear pattern of significant findings is evident from the analyses of data reported here. Statistically significant differences are found in the performance on tests of language skills between preschoolers passing and failing the hearing screening. Such differences are <u>not</u> found in performance on tests of psychomotor skills and tests of quantitative concepts. Poor performance on language tests by children identified as having hearing dysfunction is apparent when these tests are administered eight months after the hearing screening as well as on tests administered concurrently with the hearing screening.

There are some suggestive data to indicate that children with hearing dysfunction channel their intellectual energies to those kinds of learning that offer them a higher probability of success, that is, psychomotor and quantitative learning. The subtleties of language <u>usage</u> appear to be particularly vulnerable to the effect of hearing dysfunction. It is just that aspect of education in which Hawaiian children experience the greatest academic failure at all grade levels.

Though there are other social and linguistic factors that likely contribute to the language-competence problem of Hawaiian students, the importance of hearing dysfunction in the critical language-acquisition years may have been underestimated. It may

be considerably more tractable than other antecedents of educational failure.

7. **What are the implications of these findings for educational program planning for Hawaiian preschoolers?**

It would be comforting to believe that a medical solution to this educational problem was forthcoming. Unfortunately, such a solution in the practicable future seems very unlikely. There are approximately 93,000 children under the age of five in Hawaii. Of these about 26,500 are Hawaiian/part-Hawaiian. If 75% of these experience hearing dysfunction, about 70,000 (20,000 of them Hawaiian/part-Hawaiian) of these children will require medical treatment. Even if it were clear that such treatment was highly successful (and that is <u>not</u> clear), it is unlikely that such medical care will reach this population of children in the foreseeable future. In any case, those children who are now manifesting impaired language competence cannot be ignored. Whatever happens in the practice of medicine, educators have their own professional responsibility to consider.

We know how to screen for hearing dysfunction and we know that it is related to the educational performance of KS/BE preschoolers. We do <u>not</u> know what to tell teachers or curriculum developers to do to prevent these children from suffering lost language competence as a result of intermittent, moderately-impaired hearing function. The professional and research literature does not offer much in credible information to assist us. Well-designed, empirical research and development will be

required to identify and validate educational methods to solve this educational problem. Unfortunately, such research is likely to require three or four school years and substantial funding. Overcoming the educational consequences of hearing dysfunction in early childhood seems to be one of the most promising opportunities available for improving the chances for life-success of Hawaiian children.

Educational Testing

The results from the educational testing of KS/BE preschool children provide a considerable amount of useful information. Educational measurement at the preschool level has historically been problematic. Considerable literature-searching and some trial-and-error testing has been necessary to identify good instruments. The combination of carefully selected instruments, rigorous test administration procedures, and careful quality control in scoring seem to have overcome many of the difficulties encountered elsewhere.

The correlations among the tests and between the Fall and Spring scores on the same tests ($\underline{r} \cong .65$) indicate that the measures now in use yield reliable scores. Further, these correlations substantiate the validity of the tests. Tests of language skills correlate with each other more than they do with tests of quantitative concepts or psycho-motor skills. The validity of the test instruments is also substantiated by their correlation with hearing-screening results and by the results of

a comparison study of KS/BE preschoolers. Thus, these scores may be analyzed and interpreted with assurance that they are producing reasonably accurate scores of the types of educational performance they purport to assess.

There are significant differences in performance among the five school sites on these tests. Ulupono and Nanakuli preschoolers demonstrated the greatest growth in language skills, while Nanaikapono and Anahola children showed the largest improvement in quantitative concepts over the course of the school year. Generally preschoolers at Waihee and Anahola had the highest average test scores at the beginning of the school year, but differences among sites on the test scores were not significant on the end-of-year testing.

The pattern of achievement in the KS/BE preschools (see Figure 7) does not reveal any particularly strong curricular emphasis. There is as much, or perhaps more, growth in non-verbal content areas as in the language skills. The lowest relative improvement is in vocabulary. These preschoolers appear to be learning more about how to use blocks, pencils, and crayons than how to use words and sentences. This is not surprising since the development of an instructional program focussed on language-competence has only begun to be developed.

Nevertheless, there is dramatic growth in the educational performance of the children in these schools. As can be seen in Figures 8 and 9, considerable progress toward the goal of catching up to the national norm performance levels is made

during the preschool year. In the comparison study reported elsewhere (Roberts & Heath, in preparation) and as can be inferred from Figure 10, these gains are attributable to the KS/BE preschool experience and not simply to maturation.

Figure 10 is of particular interest in that it shows the KS/BE preschoolers are doing substantially better on a test of a critical verbal skill (vocabulary) than the population of Hawaiian/part-Hawaiian children entering kindergarten statewide. Entering kindergarten children in the State as a whole, and the State's ethnic-Hawaiian children in particular, are well below national norms on this test. The beneficial effects of the KS/BE preschool is clearly evident. KS/BE preschoolers have a higher average vocabulary score at the end of their preschool year than not only ethnic-Hawaiian/part Hawaiian children statewide, but also the statewide population of entering kindergartners of <u>all</u> ethnicities.

V. SUMMARY

The Kupulani project, despite its seven-year history, has the appearance of a program in its early stages of development. In the long term, useful program evaluation of Kupulani requires: (a) tangible program objectives, (b) explicit criteria of success in attaining these objectives, and (c) valid and reliable measures of these criteria. We (the Evaluation Department of CDEE) are developing instruments and other assessment procedures (a Maternal Information Survey and the Home Educational Environment Profile) in cooperation with other staff. However, clarification of program objectives and criteria is needed. Also, the interminable use of redundant data-collection forms must be brought under rational control if forms-completion is not to become, de facto, the primary endeavor of the prenatal-to-preschool program.

KS/BE preschools work. That is the predominant message from the data collected during this school year. Children who attend KS/BE preschools demonstrate dramatic growth in the competencies measured by educational tests. Further, they show more cognitive growth than other Hawaiian children in the State and perform better than entering kindergarten children of all ethnicities statewide on at least one major educational assessment. Our preschool children are not yet at the level of the national norms (except in psycho-motor skills), but they are out-performing other children in Hawaii.

We now know that our preschoolers carry the burden of hearing dysfunction in their critical language-acquisition years and that this is related to diminished educational achievement. We do not yet know what to do about helping them overcome this obstacle.

Research and curriculum development to enhance the effectiveness of KS/BE preschools has just begun. We have good reason to be optimistic about the educational future of the young Hawaiian children we are to serve.

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